

precipitate to substantially restore[s] injectivity or productivity of the well and reduces the viscosity of low-gravity, high-viscosity, asphaltene-based crude.

2. (Amended) The process of Claim 1 [further comprising the injection of a] wherein the gas is selected from the group consisting of [such as,] air, carbon dioxide, nitrogen[,] and natural gas [either alone or augmented with injection water and/or micelle treating fluid to act as a drive mechanism to move the micelle treating fluid out into the subterranean formation].

Q10 3. (Amended) The process of Claim [2] 1 wherein [a continuous injection] at least a portion of the micelle treating fluid [and continuous injection of gas] is [used as an enhanced oil recovery method for reservoirs producing a low-gravity, high-viscosity, asphaltene-based crude, when the reservoirs and devoid of any drive mechanism and production is governed by only gravity drainage] injected with the gas.

4. cancelled

5. The process of Claim 1 further comprising shutting in the well for a period of time sufficient to allow the micelle treating fluid to degrade and disperse the accumulation of asphaltene precipitate, thereby substantially restoring injectivity or productivity of a well.

6. The process of Claim 5 wherein the well is shut in for a period of 24 to 72 hours.

7. The process of Claim 1 wherein the alkyl or alkylaryl polyoxyalkylene phosphate ester is present in the mutual solvent in the amount from about 5 to 50 weight percent of the mutual solvent.

8. The process of claim 7 wherein the alkyl or alkylaryl polyoxyalkylene phosphate ester surfactant is present in the mutual solvent in an amount from 10 to 20 weight percent of the mutual solvent.

9. The process of Claim 8 wherein the alkyl or alkyl polyoxyalkylene phosphate ester surfactant is present in the mutual solvent in an amount from about 12 to 18 weight percent of the mutual solvent.

AN 9.10 (Amended) The process of Claim 1 wherein the mutual solvent comprises an alkyl or alkylaryl polyoxyalkylene phosphate ester surfactant dissolved in a mixed non-aqueous solvent comprising methanol in an amount from about 20 to 27 percent, [is] isopropanol in an amount of from about 40 to 44 percent, capryl alcohol in an amount of about 8 to 12 percent, and xylene in an amount of from about 23 to 27 weight percent.

11. The process of Claim 10 wherein 2 percent potassium chloride water and the mutual solvent are mixed in a volumetric ratio of about 2 to 1.

12. cancelled.

A12 9.11.13 (Amended) The process of Claim 1 further comprising injecting [a] the gas, [such as, air carbon dioxide, natural gas, nitrogen, or mixtures thereof] either alone or augmented with injection water [and/or] or micelle treating fluid a second time after the well has been shut in for 24 hours after a first gas injection.

14. The process of Claim 13 wherein the well is shut in for an additional 24 hours.

AB 11.13.15 (Amended) The process of Claim 13 wherein the micelle treating fluid is moved out into the reservoir contacting the low-gravity, high-viscosity, asphaltene-based crude indigenous to

the subterranean formation [and], thus reducing its viscosity to produce a lower viscosity asphaltene-based crude dispersed in the micelle treating fluid.

12 ~~14~~ 16. (Amended) The process of Claim 16 wherein the lower viscosity asphaltene-based crude dispersed in the micelle treating fluid is caused to migrate back [in the to] ~~into a stimulated~~ ^{the} well.

13 ~~15~~ 17. (Amended) The process of Claim 16 wherein the lower viscosity asphaltene-based crude dispersed in the micelle treating fluid is caused to migrate to an offset well in fluid communication with the stimulated well by use of [a] the gas, [such as, air, carbon dioxide, nitrogen, or mixtures thereof] either injected alone or augmented with injection water [and] or micelle treating fluid.

18. cancelled.

19. cancelled.

20. cancelled.

COMMENTS

The foregoing amendments to the specification are believed to fully obviate all objections to Applicant's specification. The title has been revised as requested by the Examiner, the Table has been incorporated into the specification and the graphs have been presented as Figures. None of these changes are considered to constitute new matter since all of this material has been presented in the application as originally filed.

Various other amendments have been made to Applicant's specification to correct grammatical errors, to present the specification in better grammatical form, and to add language to the specification which initially appeared only in the claims.

It is believed that the foregoing amendments to Applicant's specification have obviated all objections to Applicant's specification.

The claims as now presented commence on a separate sheet.

The objection to Applicant's Claims 18-20 is believed obviated by the cancellation of these claims.

The objection to Applicant's Claims 7-10 as not enabled by the specification is noted. The incorporation of this claim language into the specification is considered to fully obviate this objection.

The rejection of Applicant's Claims 2, 3 and 12-17 under 35 USC 112 is believed obviated by the foregoing amendments to Applicant's claims.

Specifically with respect to Claims 2, 13 and 17, the phrase "such as" has been replaced in all instances. Claim 13 now includes a reference to a first time.

The rejection of Claim 12 is considered obviated by cancellation of this claim.

The objection to Applicant's Claims 13 and 14-17 as dependent from rejected claims is believed fully obviated by the amendment of the claims from which these claims are dependent.

The rejection of Applicant's Claims 1, 5, 7-9, 11, 12 and 18 under 35 USC 103(a) as unpatentable over U.S. Patent 4,813,482, issued March 21, 1989 to William B. Walton (Walton '482), in view of U.S. Patent 5,104,556, issued April 14, 1992 to Ahmed M. Al-Yazdi (Al-Yazdi), is respectfully traversed and reconsideration is respectfully requested.

The Examiner has opined that the procedure of Walton '482 includes all of the limitations of Claims 1, 5, 7-9, 11, 12 and 18. It is respectfully submitted that Walton '482 does not show Applicant's invention as presently claimed. More particularly, Applicant's invention as presently claimed requires that an air injection step be used which was not disclosed in Walton '482 and it requires that a micelle treating fluid is used not only to disperse an accumulation of asphaltene precipitate to restore injectivity or productivity of the well, but it is also used to reduce the viscosity of low-gravity, high-viscosity, asphaltene-based crude indigenous to the formation. These steps are not disclosed in Walton '482. Walton '482 contacts the interior of the well to remove paraffin

deposits and then removes the treating solution with the paraffin. By contrast, Applicant uses a micelle treating fluid to disperse an asphaltene precipitate to restore injectivity and reduce the viscosity of the formation crude with the micelle treating fluid being displaced into contact with the asphaltene precipitate and the low-gravity, high-viscosity, asphaltene-based crude oil in the formation. Accordingly, the micelle treating fluid is injected into the formation from the wellbore by the use of the air. Neither Al-Yazdi nor Walton '482 disclose this step. Further, Claim 1 has now been amended to include the limitations of Claim 4 previously indicated allowable.

In view of these amendments and the foregoing comments, it is respectfully submitted that, since all of Applicant's claims now depend from Claim 1 which has been indicated as allowable if rewritten to include Claim 4, all of Applicant's claims are now allowable. It is respectfully submitted that neither Walton '482 nor Al-Yazdi shows or suggests any of Applicant's claims as presently amended.

The rejection of Applicant's Claims 2 and 3 under 35 USC 103(a) as unpatentable over Walton '482 in view of Al-Yazdi as applied to Claim 1, and further in view of U.S. Patent 3,653,440, issued April 4, 1972 to Joseph Reisberg (Reisberg) is respectfully traversed.

Reisberg is apparently cited to disclose the use of a waterflood project utilizing a gas and an aqueous drive liquid. It is respectfully submitted that Reisberg is not directed to a method for removing asphaltene deposits from a wellbore, nor to the treatment of asphaltene-based crude oil in a formation. Reisberg uses different surfactants and uses the air in a different way than Applicant. Applicant's claimed method contemplates the use of a gas or a mixture of a gas and the micelle treating fluid to act as a drive to move the treating fluid into the formation to reduce the viscosity of the asphaltene-based crude oil so that it may be recovered from either the stimulator well or from a step-out well. Reisberg is directed clearly to a system for flushing oil from a subterranean oil-bearing formation by the use of a flood system. Applicant's claimed method is directed to the use of a specific mutual solvent to remove asphaltene deposits and thin the asphaltene-based crude oil.

In any event, since Applicant's Claim 1, as presently amended, is considered to be patentable, it is respectfully submitted that since Claims 2 and 3 simply further define Claim 1, these claims are also patentable.

The rejection of Applicant's Claims 6 and 10 under 35 USC 103(a) as unpatentable over Walton '482 in view of Al-Yazdi, and further in view of U.S. Patent 5,038,864, issued August 13, 1991 to Michael F. Dunleavy, Andrew A. Franklin and Daniel D. Wood (Dunleavy et al), is respectfully traversed and reconsideration is respectfully requested.

Dunleavy et al has apparently been cited to show that shut-in periods have been used in the treatment of oil wells. Dunleavy et al apparently requires the use of hydrogen peroxide which is a strong oxidant dissolved in the aqueous solution used to treat wells to restore injectivity. Applicant's claimed invention does not use hydrogen peroxide. Dunleavy et al does not appear to use a gas to push the micelle treating fluid into the formation, nor is there any suggestion in Dunleavy et al that Dunleavy et al would be effective without the use of the hydrogen peroxide. In any event, since these claims are dependent from Applicant's Claim 1 which, as discussed above, is considered to be allowable, it is respectfully submitted that these claims are similarly allowable.

The indication that Claim 4 is allowable if rewritten in independent form is acknowledged with appreciation. Claim 4 has now been incorporated into Claim 1 and accordingly, Claim 1 now represents Claim 4 including all of the limitations of the base claim and any intervening claims.

Claims 13-17 have been amended to overcome the rejection under 35 USC 112. Claims 19 and 20 have been deleted.

The remaining references made of record have not been applied against Applicant's claims and accordingly no discussion of these references is considered necessary.

In view of the foregoing amendments, it is respectfully submitted that all rejections of Applicant's claims under 35 USC 112 have been obviated and it is further considered that all objections to Applicant's claims have been obviated by the foregoing amendments. It is also respectfully submitted that none of the references applied have shown or suggested any of Applicant's claims under 35 USC 103. It is therefore respectfully submitted that Applicant's claims are now in condition for allowance, and such is respectfully solicited.

A Power of Attorney appointing F. Lindsey Scott as associate attorney for the purposes of prosecuting this application is attached.

A fully executed revised Declaration and Power of Attorney is attached.

A revised Information Disclosure Statement, including the *Oil and Gas Journal* reference, is also attached.


A copy of a Petition and Affidavit of Facts: Refusal of Inventor To Sign a Substitute Declaration, with supporting documents, is also attached.

A copy of Applicant's claims in clean draft, as amended, is also enclosed for the convenience of the Examiner.

Copies of FIG. 1 and FIG. 2 are attached.

In view of the foregoing comments and the attached materials, it is believed that Applicant's claims are now in condition for allowance and such is respectfully solicited.

Respectfully submitted,


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